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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

LUU, THANH X

ART UNIT PAPER NUMBER

2878

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/899,171

Applicant(s)

KIDA ET AL.

Examiner

Thanh X Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 14-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Applicant's election with traverse of Group I, claims 1-13 in Paper No. 6 is acknowledged. The traversal is on the ground(s) that the search is not a burden on the examiner. This is not found persuasive because the subclass search required for other groups are not required for Group I. Furthermore, the inventions are recognized as divergent subject matter as evidenced by the different classifications.

The requirement is still deemed proper and is therefore made FINAL.

Claims 14-29 are withdrawn from consideration because the claims are drawn to non-elected inventions.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

3. Claim 11 is objected to because of the following informalities:

In claim 11, "said alignment mark" lacks proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable

one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is unclear to one of ordinary skill in the art how to expose the substrate while the mask and substrate are stationary. The specification (see Figure 9 and page 66, lines 24-26) discloses the substrate moving in a scanning exposure apparatus.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear in its given context how a mask and substrate remain stationary while scanning exposure is being conducted. As understood, scanning exposure (see page 9, line 20-24) requires the mask and substrate to move. Thus, the stationary state and the scanning exposure directly contradict one another.

Regarding claim 11, it is unclear in its given context how an alignment mark is measured with respect to time.

Claims 2-10 and 12 are indefinite by virtue of their dependency on an indefinite claim.

8. Claim 13 provides for the use of the exposure apparatus, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually

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practiced.

Claim 13 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1 and 13, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Nishi et al. (U.S. Patent 6,002,467).

Regarding claims 1 and 13, Nishi et al. disclose (see Figure 1) an exposure apparatus that exposes a substrate (wafer W) via a mask (R) with an energy beam, comprising an exposure system including: a projection optical system (PL) having an image field large enough so that a divided area (shot area) on the substrate exposed in one time with a scanning exposure apparatus (see column 23, line 50-60) can be exposed in one shot (see column 23, line 59) by projecting the energy beam outgoing from the mask onto the substrate; and a substrate stage (48) on which the substrate is mounted. Nishi et al. further disclose (see Figures) a lithographic process.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al.

Regarding claims 2-5, Nishi et al. further disclose (see column 23, line 29) the projection magnification is $\frac{1}{4}$ or $\frac{1}{5}$. Nishi et al. do not specifically disclose the divided area with the claimed sizes or the mask as being 6 inch in size. However, the specific sizes of the divided area or mask depend on the desired chip size. That is, it is a matter of design choice what size area to produce or what size mask is used. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide area sizes or mask size as claimed in the apparatus of Nishi et al. to obtain a desired end chip size.

Regarding claim 6, since the image field is large enough for the divided area, the image field inherently has a length or diameter in which the divided area is almost inscribed. Nishi et al. do not specifically disclose the image field as being circular. However, choosing the particular shape is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a circular image field shape in the apparatus of Nishi et al. to more easily provide lenses for the projection optical system.

Regarding claim 7, Nishi et al. disclose the claimed invention as set forth above. Nishi et al. do not specifically disclose the resolution of the projection optical system. However, projection optical systems with varying resolutions are well known. It is a simple matter of design choice which resolution to choose. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a projection optical system with a line width resolution of .35 microns in the apparatus of Nishi et al. to match the mask line width and to produce better and finer circuit patterns as desired.

13. Claims 8, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Muraki et al. (U.S. Patent 6,166,387).

Regarding claims 8 and 9, Nishi et al. disclose the claimed invention as set forth above, including a control system (see Figure 13). Nishi et al. do not specifically disclose changing a control factor in accordance with a minimum line width of a pattern. Muraki et al. teach (see column 18, lines 46-64) changing a source image in accordance with a minimum line width of a pattern which minimizes moving steps. Muraki et al. further teach (see column 18, lines 60-64) changing the focal lengths. Thus, Muraki et al. recognize that the device has to adapt to the minimum line width of the pattern. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to change a control factor or initiate an on/off automatic focusing alignment measurement in the apparatus of Nishi et al. in view of Muraki et al. to adapt to different line widths and improve the exposure.

Regarding claim 12, Nishi et al. in view of Muraki et al. disclose the claimed

invention as set forth above. Nishi et al. and Muraki et al do not specifically disclose the thresholds at which the control factor is changed as claimed. However, choosing a threshold to change a control factor is a matter of design choice. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide change the control factor in two stages at the thresholds as claimed in the apparatus of Nishi et al. in view of Muraki et al. to implement finer control as desired.

14. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. in view of Ota et al. (U.S. Patent 5,506,684).

Regarding claims 8-10, Nishi et al. disclose the claimed invention as set forth above. Nishi et al. do not specifically disclose changing a control factor or a permissible value of the physical quantity related to a position setting accuracy as claimed. Ota et al. teach (see column 10, lines 26-33) changing a control factor or changing a permissible value (threshold) of a physical quantity related to a position setting accuracy (rotational error) in an exposure device in accordance with the minimum line width. Thus, Ota et al. recognize that more accurate exposure is achieved by changing a threshold in accordance with the minimum line width. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide such a change in position setting target value in the apparatus of Nishi et al. in view of Ota et al. to improve accuracy and exposure.

Allowable Subject Matter

15. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten to overcome the 112 2nd paragraph rejection and in

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independent form including all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter: an exposure apparatus as claimed, more specifically in combination with: changing a control factor including a physical quantity related to an alignment measurement accuracy includes a quantity of selecting alignment marks is not disclosed or made obvious by the prior art of record.


Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl
February 24, 2003


Thanh X. Luu
Patent Examiner